

Brown Street Bridge
Spanning Oil Creek
Titusville
Crawford County
Pennsylvania

HAER No. PA-135

HAER
PA
20-TITV,
3-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

HISTORIC AMERICAN ENGINEERING RECORD

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BROWN STREET BRIDGE

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Location: Brown Street Bridge, spanning Oil Creek,
Titusville, Crawford County, Pennsylvania

USGS Titusville South Quadrangle,
UTM: 17.611160.4608650

Builder: Keystone Bridge Company

Date of Construction: 1898-1899

Present Owner: Crawford County Commissioners

Present Use: The bridge has been closed to vehicular
traffic since 1984. Use of the bridge is
presently restricted to pedestrian and
bicycle traffic over Oil Creek. The
structure is scheduled for demolition and
replacement.

Significance: The Brown Street Bridge is representative
of the type of small steel and iron truss
bridge that was favored by smaller munic-
ipalities and rural settlements during
the last quarter of the nineteenth
century. The construction of the bridge
formed part of the community's planning
effort to improve access between the
industrial and commercial zone north of
Oil Creek and the residential area south
of the bridge.

Project Information: This documentation was conducted in July,
1989, in accordance with an agreement
between the Federal Highway Administra-
tion, the Pennsylvania Department of
Transportation, and the Pennsylvania
State Historic Preservation Officer, as a
mitigative measure prior to the demoli-
tion and replacement of the existing
Brown Street Bridge.

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HISTORY AND SIGNIFICANCE OF THE BROWN STREET BRIDGE
TITUSVILLE, PENNSYLVANIA

The Brown Street Bridge is located in Titusville, Crawford County, Pennsylvania and spans Oil Creek. Titusville was initially known as Oil Creek and from early historic times was visited by Native Americans and European settlers who used the oil skimmed from the surface of local creeks for medicinal purposes. Samuel Kerr and Jonathan Titus were the area's first European settlers, arriving in 1796. Kerr and Titus arrived at the site of Titusville as surveyors in the employ of the Holland Land Company and stayed to settle in the area.¹ In 1859, Colonel Edwin L. Drake successfully drilled the first American artesian oil well in Titusville. Prior to the emergence of the oil industry, the town's economy was based primarily on lumber, which was rafted to market by way of Oil Creek and the Allegheny River.²

The history of settlement and economic expansion in Titusville and the surrounding area during the latter half of the nineteenth century and the early twentieth century was intimately tied to the emergent oil and natural gas industries. The influence of these industries on the growth of Titusville is reflected in its rapid growth during the mid-nineteenth century; incorporated as a borough in 1847, the settlement achieved town status in 1848 and became a city in 1866. The first refinery in the region was established in Titusville by Parker, Abbott and Barnsdall circa 1862. During the years which followed Drake's enterprise, the number of oil refineries and their production capabilities increased so that by 1872, eleven refineries were in operation in Titusville.³ Oil refining remained an important foundation of the local economy during the latter quarter of the nineteenth century and continued into the twentieth century.

According to information contained in the Brown Street Bridge National Register of Historic Places (NRHP) Nomination Form, the bridge was built in 1898-1899 by the Keystone Bridge Company which in 1900 became the American Bridge Company.⁴ No evidence of bridges predating the present structure was found during the Brown Street Bridge HAER literature review. An 1876 map of Titusville indicates that no creek-crossing facilities existed at Brown Street at that time.⁵ The map indicates that the area south of Oil Creek had been platted and settled by that date, despite the absence of any nearby river-crossing facilities. Since its construction, the bridge has facilitated the expansion of city services into the area south of Oil Creek and historically provided quick and easy access between the southern residential neighborhood and the city's commercial and industrial core north of Oil Creek. An 1944 City Zoning map of Titusville indicates that the section of Oil Creek

near the bridge served as a distinct boundary between a zone of heavy industry which lined the northern bank of the creek and a residential area south of the Brown Street Bridge.⁶ Although it has been closed to vehicular traffic since 1984, the importance of the bridge in facilitating movement across Oil Creek is reflected in the number of vehicles crossing the bridge during the early 1980s. According to a 1981 estimate of average bridge use, approximately 1000 vehicles crossed over the bridge each day.⁷

The single-lane Brown Street Bridge is an example of the Baltimore Through Truss design and was originally constructed between 1898 and 1899 by the Keystone Bridge Company. The development of the Baltimore Truss and other truss forms arose from an evolutionary trend in bridge design that emphasized reduced material requirements and stronger, improved weight-bearing capabilities. Much of the impetus for the development of metal bridge technology was related to improved railroad technology, which resulted in more efficient locomotives and substantially greater rolling stock loads. This trend led to a demand for cost-effective crossing structures capable of bearing these increased loads. By 1850, improved metallurgical technology had reduced the costs of rolled wrought iron, which was increasingly employed in the construction of all-metal bridges.

The trend toward greater reliance on all-metal bridges was hampered for a time by the disastrous collapse of a New York and Erie Railroad metal truss bridge at Laxawaxen, Pennsylvania in 1850 and by a series of railroad bridge failures which occurred at a rate of twenty-five per year during the 1870s and 1880s. These problems resulted in an increased effort to improve the quality of bridge design and structural materials. Better engineering standards and a reduction in the manufacturing cost of rolled structural steel during the 1880s resulted in the widespread use of steel bridges toward the end of the nineteenth century.⁸ In the case of the Brown Street Bridge, the role played by Pittsburgh steel production in the construction of bridges in the Titusville area is clearly reflected in the Carnegie Company stamp noted on several steel members.

Between the mid-nineteenth century and the early twentieth century, metal truss bridges were the most common bridge type in the United States. The popularity of these all-metal truss bridges was due to the fact that they could be constructed easily, cheaply, and required no specialized skills. Their cost and simplicity were especially attractive to small municipalities.⁹ The Baltimore Truss was developed during the 1870s by the Pennsylvania Railroad. It was subsequently used in the building of highway bridges during the last quarter of the nineteenth century. The development of the lattice panel design represents an innovation in the bridge engineering standards of the time and was part of ongoing efforts to achieve a reduction in structural material requirements, to

increase the load-bearing capacity of bridges, and to develop aesthetically pleasing bridge designs. Although the Brown Street Bridge is not especially unique to the western Pennsylvania area, it is a clear example of the Baltimore Truss form. There are at least four Baltimore Truss bridges located on the Pennsylvania highway system and an undetermined number on local roads throughout the state.¹⁰ The erection of the Brown Street Bridge in 1898-99 reflects the continuing popularity of this highway bridge type at the end of the nineteenth century.

The Brown Street Bridge originally consisted of a wrought iron superstructure that rested on ashlar stone masonry abutments. Consisting of twelve equal lattice panels, the bridge measures 185 feet in length, 25 feet and six inches in vertical height, and has a cartway width of fourteen and one-half feet. The single-span bridge has a center-to-center truss width of eighteen feet and a six and one-half foot cantilevered walkway. In its present configuration, the upper timber plank deck is supported by a series of wide flange steel stringers which in turn are supported by steel floor beams that rest on ashlar stone masonry abutments.

Numerous structural modifications were made to the bridge during its use cycle, in order to strengthen its substructure and to prolong its servicability. Although specific dates for these alterations are unavailable, modifications included the welding of approximately 75% of the pin connections, the emplacement of concrete fill and welded reinforcing bars in the end posts and bearing members of the truss, maintenance-related patching of the abutments, and replacement of the timber deck.¹¹ Despite these efforts, the various structural elements comprising the substructure of the bridge have seriously deteriorated in recent years. In time, the welds contributed to the bridge's structural instability and severe corrosion has weakened the main truss bearings, truss hangers, stringers and stringer bearings, sidewalk floor system, and bridge seats. Structural members located in the southeastern corner of the bridge have deteriorated so badly that they have buckled under the tension exerted along the lower chord of the bridge. Structural weaknesses have developed in a majority of the connecting truss web members. Portions of the wooden deck have rotted and the pedestrian walkway has been made more secure by laying down a path of pressed particleboard sheeting.

In summary, the Brown Street Bridge is an example of the all-metal truss bridge which was popular in smaller municipal and rural settlements during the last quarter of the nineteenth century. The development of such crossing structures reflects the technological efforts of the time to improve the strength and cost-effectiveness of railroad and highway bridges. The construction of the Brown Street Bridge in 1898-1899 represented one aspect of late nineteenth century city planning in Titusville. It resulted in

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improved accessibility between the industrial and commercial zone north of Oil Creek and the residential area south of the bridge.

Notes:

- 1 Samuel P. Bates, Our County and Its People. (1899), p. 293. Copy in the collection of the Carnegie Library, Pittsburgh.
- 2 Bates, op. cit., p. 304.
- 3 Warner, Beers & Co., History of Crawford County, Pennsylvania (1885), p. 477.
- 4 James P. Rice, Brown Street Bridge National Register of Historic Places Nomination Form (Pitcairn, 1986), p. 8.
- 5 Everts, Ensign & Everts, Combination Atlas of Crawford County (1876), p. 115. Reprint in the collection of the Historical Society of Western Pennsylvania, Pittsburgh.
- 6 Frances Mae Hanson, A Geographic Synthesis of Crawford County, Pennsylvania Based Upon Six Areal Divisions (1948), p. 55.
- 7 Neilan Engineers, Brown Street Bridge Replacement Project/Preliminary Case Report (Somerset, 1988), p. 2.
- 8 William Shank, Historic Bridges of Pennsylvania (1980), pp. 46-52; and Encyclopedia Britannica (Chicago, 1955) Vol. 4, p. 125.
- 9 Pennsylvania Historical and Museum Commission (1986), Historic Highway Bridges in Pennsylvania, pp. 16, 109, and 126).
- 10 James P. Rice, op. cit., p. 7.
- 11 Neilan Engineers. op. cit., p. 4.

SOURCES OF INFORMATION AND OTHER REFERENCES

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